**What factors act as barriers and enablers for braille users undertaking GCSE music?**

**Harry Cox 2019.**

**Introduction.**

The concept for this project came about through a series of events that started with two of my blind students wishing to study GCSE music. I do not play an instrument and was unable to read sheet music at the time; however, I agreed to try to learn music theory and the relevant braille so that they might pursue their studies.

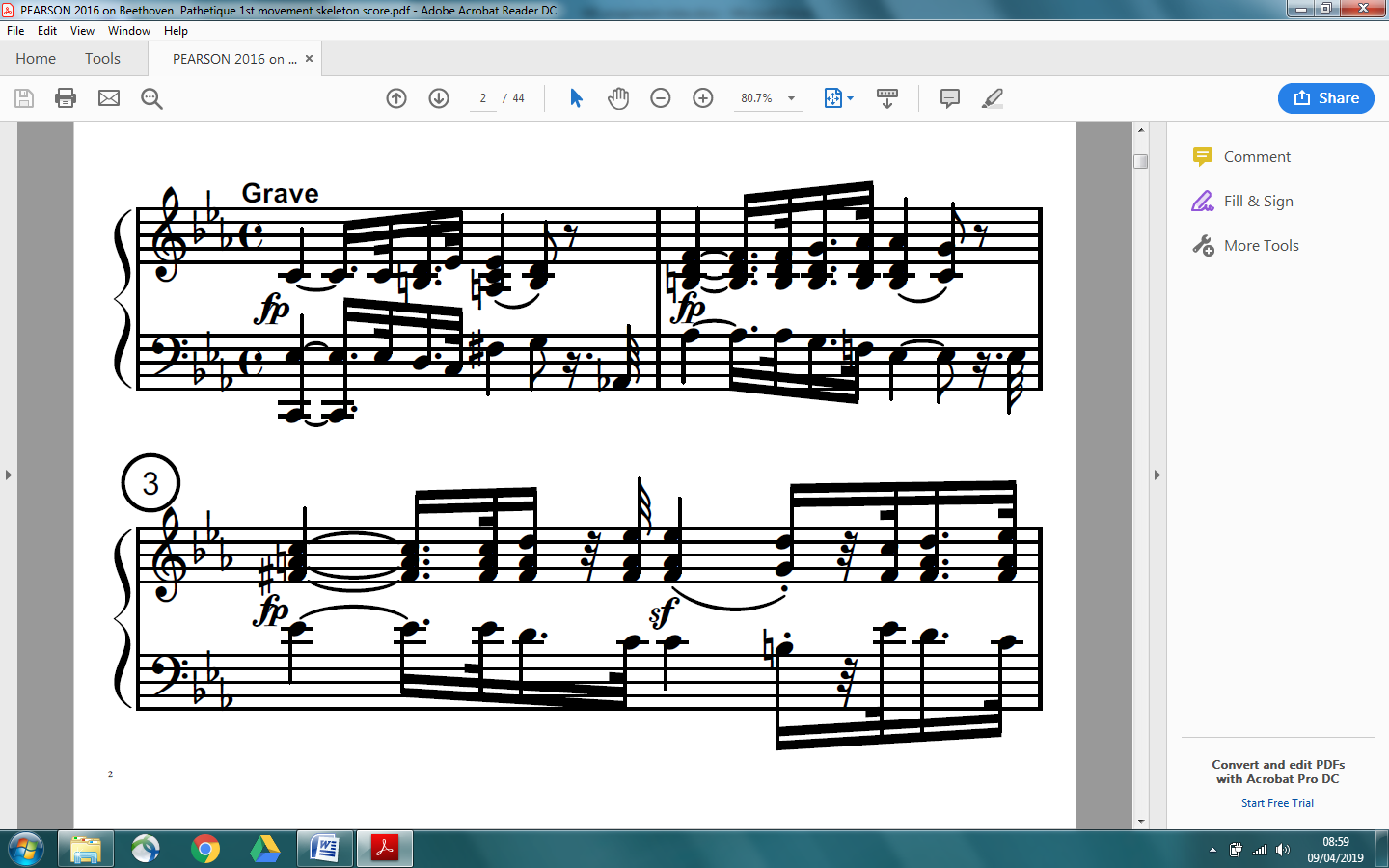
First and foremost I had to find out what level of understanding was required for the course; then learn the relevant terms and notations in print and the braille equivalents. Herein was a massive barrier: all of the source books that I had access to were written by musicologists on a level that was nigh on inaccessible to a layman like myself. I was often reading explanations from three source books, all of which gave different definitions of the same term and I would be unable to derive the true meaning of the term. Fortunately, my wife works at the Royal Academy of Music and patiently explained things to me when I was stuck. Over several months, I created my own "idiot's guide"; two parallel documents, one to explain the terminology, the other for the braille equivalent and rules. By this time I had been in touch with Sally Zimmermann from the RNIB Music Advisory Service, and UKAAF music chair, who kindly came down to meet my students and the respective schools' music departments. It turned out that no one had created a layman's guide to braille music that someone with no specialist knowledge in music or braille could use to teach a braille user; the closest to this was **Wesseling's (2004)** Focus on Braille Music. I was then roped in to the Daisy Consortium and World Braille Council's conferences on music accessibility for those with Vision Impairments (VI). From this and discussions on the VI Forum, it became clear that there was inequitable access to GCSE music for braille users, which made me wish to further develop my work so that braille users without specialist support would not be limited in their option choices. However, to create something meaningful and effective, I needed to gather a wider range of views on the barriers and facilitators to learning the music braille code and accessing the curriculum. To do so I sent out surveys via forums and mailing lists, interviewed my blind music students and talked with members of the RNIB and UK Association of Accessible Formats (UKAAF). It is this process and the subsequent information gathered that I shall analysing and presenting in this assignment along with my conclusions.

**Literature Review**

There is comparatively little literature available on the topic of teaching music braille and nothing specifically for GCSE students, presumably due to being a highly specialised field with a low instance of uptake amongst braille users influenced by a lack of accessible teaching resources and specialist knowledge. The majority of specialist teaching and learning resources being available in hard copy and requiring purchase, little is readily available online for free. Herein lies one of the greatest problems: technical language. The most significant and recommended music braille resource books such as the **BANA (1997)** Music Braille Code or **Krolick B (1996)** New International Manual of Braille Music Notation assume a background in music theory.

**Salisbury (2008)** makes a brief reference to music braille to say that the QTVI can advise and that the code is appropriate for any fluent braille user with an interest in music. Yet she reaffirms that it is not possible to read and play simultaneously, so students should memorise music. **Firman & Zimmermann (2016)** also highlight this point and the subsequent need for memorisation of music. Baluji Shrivastav, a blind Indian musician famous for his sitar playing, is investigating the means of a braille gadget that might fit on to part of the body, such as the neck, that will allow the musician to effectively sight read. This has met with both interest and scepticism as some believe that, in theory, it would give equal access but many believe that it would not be possible to focus on the braille and play simultaneously due to the linear intricacies of music braille.

Braille, being in itself a specialised field of expertise, is difficult enough for many to master. However, braille music is considered by many, such as **Nichols (2010)** to be significantly more challenging than braille maths codes due to the complexity of print music. This generalisation is true, if considering the different notations forms for different instruments as well as the more complex pieces of music such as Beethoven's Pathétiquesonata as the extract below shows in both print music and simbraille\*.



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However, if focussing on a single instrument form such as keyboard and only up to a level such as GCSE, then although still complex, a student without cognitive impediment should be able to achieve grades equitable to their fully sighted peers. To facilitate this further still, as **Salisbury (2008)** points out, such complex pieces should have the score simplified and unnecessary elements removed for students. Supporting this **Firman & Zimmermann (2016)** point out that print music is a graphic code where multiple references can be read simultaneously, whereas the music braille code is linear. Hence it is more challenging for a braille user to access music scores. Sally Zimmermann currently works with examination boards to produce accessible examination papers for the GCSE music examination.

\*These pieces have been taken from the Pearson 2016 skeleton score in modified notation.

**Busch (2016)** highlights the point about differences in braille codes over time and that some are still more readily available than current versions. This is indeed true and highlighted by the recent change in section repeats. Until very recently the way to show a section repeat such as bars 1-4 would have been #1-#4 However, in all examinations from this year onwards, the start of a section repeat is marked by <7 and <2 denotes the end.

Such barriers along with the government cuts in performing arts of approximately £14 million, according to **Snow (2017)**, in the last few years has impacted upon provision in schools thereby further reducing the possibility of access for blind students. According to **Rose (2012)** approximately 18-20,000 of the 2 million vision impaired people in the UK use braille. There are no approximate figures for whom out of the braillists can also read music braille. It would be a fairly safe assumption to say that less than 10% of these would have any working knowledge of it. When considering the specialised nature and the reduced funding the number of people able to teach it must be significantly less and in probable decline.

Yet all is not regressing to another Dark Ages for blind musicians as Rodenberg (1929) would call it. **Teasch (2013)** and **Ware (2009)** have both written clear introductory instructions for music braille and others such as **Smaligo (1999)** created resources reference lists for people requiring source materials. More recently the World Braille Council and the Daisy Consortium have been working collaboratively with other accessible formats and technology companies to address many of the aforementioned issues such as lack of resources, access and specialist knowledge. Kevin Carey, Chair World Braille Council, said at one meeting (31-10-18) "**If all of the people in this room were killed in a coach crash, it would be the end of braille music**" To me it served to highlight just how few people were influential in supporting blind musicians around the world and the need to improve the access and understanding of those wishing to support such students.

This quote led me to query how many people were out there, in the UK, who understood music theory, could read braille and/or music braille and how students could effectively access support, materials and the curriculum.

**Project Design and Methods.**

Although I was fairly secure in my own knowledge and understanding of the barriers and facilitators surrounding music braille access, I needed to confirm my experiences and assumptions by pooling the combined knowledge that I had access to: the RNIB, UKAAF, VI Forum and Daisy Consortium as well as that of my students, their teachers and LSAs. This should allow for an unbiased conclusion to be derived from subjective responses based on interview and survey questions. A further investigation into access technology and materials would also be required; this is discussed in the results and discussion section.

Before interviewing my blind music students, I created a parental permission letter and gave them each a copy to be signed (a blank copy of which has been included in the Appendices). Their names have been coded by letters to ensure anonymity in this project and the permission slips were kept securely locked away until completion whereupon they were disposed of in a confidential waste bin. Having read about the links between the blind and music, firsthand accounts might shed more light upon the reasons. Their viewpoint as the learner would allow me to gain further insight and be able to balance the views of the professionals particularly with respect to how their access has been facilitated, the quality and range of resources and the delivery of the course and music braille content from both myself and subject staff.

The professionals required a concise and comprehensive questionnaire to complete. As such, I created a series of questions to determine knowledge and understanding of braille and music, from drop down box options, along with the respondents' views on the key barriers and enablers for blind students studying music, in text boxes. This was posted on SurveyMonkey, included in the Appendices, and shared on the VI Forum and with a number of local schools with blind students. The survey settings ensured that all responses were anonymous, but some people did contact me directly after completing it. 35 people working in the UK with VI children completed the survey. From this, it is clear that there is a wide range of expertise and levels of knowledge: from QTVIs who teach braille music to Learning Support Assistants (LSAs), and from special schools to mainstream settings.

A duplicate survey went out globally via the Daisy Consortium with the same parameters and although there were not as many responses, most of the respondents do not work directly with braille users but are involved in producing accessible format programs and resources for various companies such as Daisy, Dancing Dots and the UKAAF. This data will be referred to, but because of the low prevalence of teachers, it will not play as significant a part in the results and discussion sections.

The advantage of the online survey was that it was more accessible and quicker to complete, so it is highly probable that more people completed it than if I had sent out a form via email or post. Responses were instantly recorded along with basic data and gathered from professionals around the world, including Australia, Sweden and America as well as the UK. The obvious disadvantage was in the self limiting range of responses based on the range of questions I presented. Yet I had to consider that teachers and LSAs have very busy school days and time is limited for non-directed activities such as this. This factor obliged me to limit the type and number of questions so as to ensure that the time required for completion would not dissuade people from responding. With not all respondents completing all sections for data analysis purposes, the Daisy Consortium results are incomplete and would skew the overall results. As such only their written responses will be used for analysis.

With regards to the student interviews, had I been able, I would have liked to interview other students in the same situation since my students may have been biased in some of their responses as I am the one that taught them music braille notation and who has supported their learning.

**Results and discussion.**

This section will depend on the kind of data that you have collected.  For example, you may have collected views, or data from observations or rating scales.  You do not need to include all of the data collected in this section, but need to think of ways of summarising what you have found.  There may be some key themes that have emerged from the data and the presentation of the results could be structured around the themes.  You can choose to use tables and graphs and if you do, it is important to label them so that the reader can understand them easily.  In this section, you also need to describe how you have collated and analysed the data.

**Interviews:**

For AV, music is about the pleasure of sound and the emotions that it can evoke as well as the enjoyment derived from learning to play new instruments. She very much plays by ear and finds that many instruments lend themselves to those with VI since they are very tactile. The guitar was notable with the frets so that you could feel exactly where your fingers are in relation to the strings and the neck of the guitar. Her whole family is musical and all of these things have encouraged her to take GCSE music.

KG has enjoys music as it is the one subject that he feels he can do on a par with any fully sighted individual, especially his peers. He also wishes to pursue a career in the music industry.

AV has found learning music braille notation to be fun and, although there is some confusion with similar signs, it has been very helpful in supporting her understanding of music theory.

KG is fluent in music braille and has found it relatively straight forward to learn. He has a quieter, more pragmatic approach to it than AV.

Composition has been the hardest aspect for AV as Sibelius does not lend itself to a blind user, even with speech software. KG's school uses GarageBand and he too was unable to access the program on the Mac without support. Both students found the GarageBand app more accessible, but recognised that it was far more limited than the full version.

The lack of class teacher understanding of the different approaches to learning music and exams access for both students has presented a significant barrier, and this has been reiterated by 32% of all survey respondents. This could be said of any subject teacher, but many assume that the student simply learns aurally (confirmed by the survey comments), so often omit to provide the tactile equivalents of printed resources that other students receive. Both AV and KG demonstrated themselves to be more acutely aware of the pitch and tempo of music. From discussions with various people, it is likely that the loss of vision which makes up around 80% of our sensory input allows for the brain to allocate a greater processing capacity to those senses that are normally less important. Hence a blind individual appears able to focus more intensely and analytically on audio than a sighted person; as for them it has become their primary sense. There is also an assumed level of understanding from the teacher in that all students understand exam questions and technique equally. For KG, we put additional interventions in place with the subject teacher to bridge this deficit after analysing his mock examination result.

**Surveys**

The survey data and unedited responses have been included in the Appendices.

A total of 49 people supporting a total of 290 braille users responded to the two surveys. Analysing the raw data from the VI Forum and local schools' responses 46% of the students have an interest in music and 26% of the total either would or do study GCSE music. This is higher than I had previously assumed and begs the question "How many braille users have missed out due to lack of provision?"

An impressive 47% of respondents could read music and Unified English Braille whereas 6% had no music or UEB knowledge at all. Only 11% of the total could read music braille. From personal contact, these individuals were specialists from the RNIB, UKAAF and New College Worcester. In comparison, 65% of the Daisy Consortium respondents were fluent music braillists.

Breaking down the comments about potential and current barriers to learning, I found that there were some fairly common themes:

* Lack of knowledge/support.
* Lack of time/resources.
* Access to technology.
* Subject teachers.
* Students.

The same general barrier categories were found to be applicable for the facilitators.

Unsurprisingly the lack of specialist knowledge either from staff or the availability of specialist teachers was the single greatest barrier. In turn, increased knowledge and access to specialist provision was identified as the greatest potential facilitator.

Both the **New International Manual of Braille Music Notation (1996)** and the **Music braille Code (1997)** are 323 to 362 pages long respectively which, combined with the explanations by musicologists, make it both off-putting to most and highly inaccessible to non-musicians. Most explanations assume a very good knowledge and understanding of standard music notation; without which, quantum field theory might be easier to comprehend. If this was not sufficient to deter the most zealous of staff, because of the possible variations in musical interpretation, there are significant differences between, and even genuine mistakes in, both manuals. Such challenges, along with time constraints, were mentioned in a number of comments by individuals wishing to learn the music braille code but being unable to.

For the student, just as literacy is important for other subjects, musical literacy is important in playing a piece as the composer intended. Simply playing by ear does not always allow the performer to recreate the subtleties that could only be understood by reading the original music score. Again this impacts upon music theory as well as curriculum and examination access.

As with braille literacy, a significant number of people who have contacted me or completed the survey said that for any braillist, braille music notation should be introduced as early as possible, ideally at the same time that print music is introduced to fully sighted students. Yet the aforementioned universal lack of knowledge again appears to create significant restrictions upon learning.

Yet it is within this area that examination access has not been mentioned, much to my surprise. Transcription companies within the UK generally do not have the specialist knowledge to accurately transcribe braille music. Instead, they rely upon translation software to do the job, but are unable to ensure that formatting is correct or appropriate. This is being addressed by the RNIB with examination boards, as discussed at the RNIB's "Exam Update" meeting (09-01-19). Currently, for EDEXCEL, the RNIB Music Advisory Service adapts and transcribes the GCSE music examination papers. This means that these papers do not cause confusion and subsequently disadvantage the student, unlike other examination boards who use private transcription agencies. The excuse that I received from one examination board regarding incorrect layout and formatting in a number of their papers was "well the student has to be able to cope with different ways of working". Since there are universal rules for layout, this does not equate to equitable access.

The second unsurprising factor was the lack of time and availability of resources. At present the pressure on teachers to achieve performance targets and the changes to the curriculum, combined with the financial implications of staffing faced by the majority of schools in the UK, is greater than ever before. This pressure and subsequent workload impact upon the time and support available for students with Special Educational Needs and Disabilities (SEND). As mentioned in the survey comments, teachers being able to plan ahead so as to provide teaching materials ahead of time for someone with an understanding to adapt for the student is a massive challenge on several levels. Few music teachers understand the implications for a braille user and how to adapt their teaching methods to cater for them. It is the same for QTVIs when considering an understanding of music and music braille, so support is often lacking for the teacher, LSA and student and although the QTVI can normally seek specialist support, little or none may be available in their geographical location.

The lack of resource provision again impacts upon music braille literacy which is an important factor in the listening part of the examination paper. Without this, approximately 40% of the overall marks are inaccessible and with Progress 8, students are often dissuaded from opting for music because of the impact upon their grades and that of the school's performance.

The final key factor from the survey responses was access technology and the subsequent cost and limited understanding of how to use transcription software for in-house resourcing. One might assume that current technology would be a straight forward resolution to many of the issues. The Goodfeel® program by Dancing Dots, originally created in 1994, is widely acknowledged as the best music transcription currently available. Yet it is an incomplete program requiring any music file to be converted into a MusicXML file (typically from Sibelius), then opened in Lime Aloud to be converted into a LIME file, then opened in Goodfeel® to convert into a braille file and finally opened in Duxbury to be appropriately formatted into the appropriate layout and finally embossed. There is currently no complete package that is able to do this accurately, although the Daisy Consortium, along with the World Braille Council, are trying to draw together different software manufacturers and music specialists to facilitate music access for the vision impaired. The current alternative is BrailleMUSE, an online free transcription program that only required a MusicXML file to create a music braille score. Yet it too is not infallible and requires someone with an understanding of music notation as well as a good working knowledge to proof read and edit where necessary; so, again, it not truly accessible by a layperson.

There is a lack of provision in mainstream schools for blind people to study music. Specialist schools such as the Royal National College for the Blind in Hereford or New College Worcester have the means. Yet such schools are struggling to stay financially afloat having been directly affected by local government cuts and the demand to save money by keeping students in the locality.

**Conclusion and Recommendations.**

The three key factors, knowledge, resources and technology, are both the greatest barriers and potential facilitators as evidenced by the survey and my own findings. Of course, there will be other matters subjective to the students, staff and schools but these appear to be of lesser importance and more diverse in comparison. These could be addressed in a larger project, but due to the word limit they will have to be omitted on this occasion.

If I were to address the shortfalls of this study, I would classify the individual area of work for survey participants, i.e.: LSAs, QTVIs, industry professionals etc. The opportunity to observe music lessons at New College Worcester or RNC Hereford and to talk with a greater range of braille users would give a more focussed insight as to views, how they relate to the different perspectives/roles and their impact in the overall academic process.

Lack of knowledge is the greatest initial factor. As previously discussed, there are relatively few individuals who can support students. To put this in to perspective, the American Library of Congress only has 42 approved music braille transcribers for the entire country. There are likely far fewer for the UK, so student access to such individuals is highly limited. Accessible teaching and practice materials are limited and fall short of the GCSE syllabus requirements. There is currently no framework or package available for such students and teachers/LSAs. This, combined with my work with AV and KG, has led me to develop my own resources with the support of James Bowman (UKAAF) and Sally Zimmermann (RNIB). This will, eventually, be a complete teaching and learning package with parallel print and braille lesson plans containing exercises with questions and answers for any layperson supporting a braille user. This should reduce the need for direct specialist intervention and thereby increase the opportunity for a capable student to opt for GCSE music.

Resourcing, whether accessing materials or production, is a great challenge that can only be resolved with directed time and file sharing. It requires a knowledge base, and often finances, to use or access transcription services and programs including online and embossed materials. This is more for the day to day lesson access rather than the more readily available anthology pieces. The Library of Congress’ National Library Service and braillesheetmusic.com are excellent sources, as is the RNIB Music Advisory Service. However, relatively few people are aware of them and there are limitations. By raising QTVI awareness of this and their facilitating of inter-school collaboration, establishments would have greater access to resources, improve engagement and reduce the subsequent time commitment for staff.

The issue of technology, the last of the predominant three key areas, is one that is not currently possible to entirely resolve. For the current transcription programs, a working knowledge of music braille is required to ensure accuracy. Neither GarageBand or Sibelius on PC lend themselves to independent access by blind users and the accessible music apps are restrictive in their content. Although companies are investigating music accessibility, the majority focus on audio formats and financial returns compared to investment in music braille based technology make such an endeavour economically unviable.

Apple Mac computers lend themselves more to those with VI with the accessibility software and are also the industry standard for music production, which may facilitate access to such music software. However, this is an area for further investigation to find ways to improve independent composition and score/file manipulation.

The composition and transcription software will remain a peace-meal affair until a significant investment is made to design a VI friendly one-stop package or two separate, yet compatible, programs.

Finally, the student must be resilient, communicative, engaged and cognitively capable of learning the music braille code. And, as with any learning, the earlier the code can be introduced, the greater the opportunity the student has and the more time there is to seek facilitatory access when barriers present themselves through collaboration.

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